Archives of Psychiatry and Psychotherapy
Volume 5, Issue 1, March 2003
pages 5–13

Psychiatrists looking at biology. What are they expecting?*

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The aim of the study is a reflection on a new perspective for psychiatry created by new integrated research on early human development and interaction of its determinants.

Key words: integrated approach, early development

Challenge of presenting psychiatrist's view of biology is provoking and difficult. Some years ago, with Bogdan de Barbaro [1] trying to present a portrait of psychiatry, we came to conclusions that the task is unrealistic. Psychiatry has been changing and developing in too many directions. Nevertheless, psychiatrists have no doubts their discipline belongs to the domain of medicine. However, other physicians still perceive psychiatry as enigmatic, mysterious and being far from science.

Precise description of the subject of psychiatry is not an easy task. Lucjan Korzeniowski [2] gave a descriptive definition of psychiatry: "a branch of medicine, whose subject is mental illnesses. Covers their aetiology, pathophysiology and pathogenesis, symptomathology, clinical aspects and treatment. In its theoretical and practical search psychiatry uses achievements of neurology, neurophysiology, genetics, biochemistry, anthropology, psychopharmacology, sociology, psychology and many philosophical interpretations... In contemporary psychiatry one can see development of many, to some extent independent sub-disciplines ... Problems of psychiatric prophylactics, especially in their social and educational aspects are dealt with by mental hygiene." The definition was written for the Polish dictionary of psychiatry. Authors of the next dictionary abstained from the approach to define psychiatry at all [3]. Korzeniowski's definition is important as it indicates a great number of sciences concerned on human being that psychiatry needs and uses. Even if it cannot be regarded as satisfactory (the term "mental illness" postponed since the time it was constructed [4]), it does not enlist biology among sciences useful for psychiatry. But, Korzeniowski put at the first posi-

* The first version was presented at the session "Approaches Integration", 40th Congress of Polish Psychiatrists, Krakow, June 14–17th 200.

tion neurology, a medical discipline psychiatry emancipated from, and now seems to be coming back to it. He also named disciplines, which developed from biology. Since the time the definition was edited the number of such scientific disciplines has grown up, to mention psychoimmunology and above all neuroscience only. Korzeniowski listed another group of disciplines psychiatry uses: anthropology, sociology, psychology and philosophy. In such a way reflected a dichotomy in psychiatry: of biological and humanistic orientation. The dichotomy noticed in the 1930's by Jakub Frostig: "Appearance of psychiatry has completely changed. Biological and psychological parts have developed. Both, yet unknown to each other today, often claim the right to solve psychiatric problems. In spite of this efforts aiming at integration of varying approaches become more and more often [5]. So, the hope to overcome dichotomy in psychiatry is nothing new. However, after three-quarters of a century it does not seem the efforts in integrating varying approaches brought the fruits hoped for.

Is this integration purposeful? It seems that what is worth the efforts is mutual interest of psychiatrists' of both orientations in their ways of problem formulation and achievements. State of knowledge in psychiatry can only profit from this. Such integration could be perceived as a process. The final solution of all questions mental disorders provoke us to, seems to belong to omnipotent dreams.

On the other side one should remember, that the development of psychiatry "towards biological orientation" and "towards psychological orientation" reflects the basic discussion characteristic for our culture. Human mind and human behaviour have been approached with the essential question on identity of mental and physical phenomena [6, 7].

It should be also remembered, that psychiatry, a clinical discipline, has not elaborated its own scientific methodology. In its own research relies on methodology developed by natural and humanistic sciences. Nowadays, with significant achievements in biology, looking for adequate methods turns rather towards the last one than towards psychology or cultural anthropology. Psychiatric psychopathology and nosography developed through the 19th century, as it seems, have been used to their limits. Psychiatry is looking for new solutions. An example can be presumptions forming a background of new classification of mental disorders in DSM-IV [8].

Psychiatry efforts to become a scientific discipline

Descriptive background of psychiatry formed on valuable observations and explorations prove their usefulness in everyday clinical practice: in diagnostic process, expertise formulation, and in treatment. Nevertheless, conceptualisations of mental disorders based on this background appeared to be insufficient. They failed to give satisfactory explanation of abundance and variety of experiences of those who are diagnosed as mentally disturbed. The very existence of mental disorders cannot be questioned, nevertheless psychiatrists' opinions on the disturbance in a given person very often are incongruent. There is also a risky possibility of arbitrary declaration that given phenomenon is, or is not, a mental disorder. Let a Soviet concept of "*white schizophrenia*" [9] be an example. Yet another is the position on homosexuality which

lost the status of a disorder. Or, cultural criteria included as necessary to diagnose for example possession [10, 11]. It can be easily understood that psychiatrists would like to rely in their diagnostic process on the criteria more measurable and harder than behaviour observation, subjective patient relation on her/his experiences, or observation and analysis of their own experiences in relation with the patient.

The hope for such measurable and solid criteria seems to be achieved in the way analogue to that developed in somatic medicine, in the way of finding measures – biological in nature and difficult to question. The goal would be to find a standardised measure of some substance, or its dynamics – proved to be pathognomic for mental disorder! Or an image of a structure of a body part, or pattern of function, proved to have the same properties! Well such an understanding of biology failed to fulfil psychiatrists' hopes. Except for mental disorders in Syphilis none were given biological diagnostic measure. But experience with mental disorders in Syphilis taught psychiatry that establishing a solid relation between infection, biochemical and immunological measures, and presence of specific psychopathological symptoms gave spectacular results. Introduction of early antibiotic treatment after infection led to successful prevention of its late mental symptoms and sent sophisticated descriptions of *paralysis progressiva* to the history of psychiatry [12]. But the history of *paralysis progressiva* pushes forward a question of the meaning of psychopathological analysis. The description of various clinical manifestations of the disorder, nor its dynamics did not bring psychiatrists closer to effective treatment and prevention methods. On the other side discovery of bacterial infection as the causal factor and finding of effective antibiotic therapy did not explain the variety of symptomathology of the disorder.

Contemporary efforts in research on schizophrenia bring an impression of similarity. Official psychiatric bodies declare a consensus on a multifactorial, complex character of schizophrenia group disorders. Nevertheless, psychiatrists have been busy looking for the only one, the most important cause of the disorder for decades. In the last decades this cause to be found is expected to be of biological nature. These are fascinating studies. Their results are fascinating too. The body of knowledge of the functioning of the brain, metabolism of substances engaged in its functioning, metabolism of neurones, complicated ways of information processing in the brain has been gathered thanks to these efforts.

The problem the science puts is in the necessity of precise formulation of the subject of the studies. It appeared that the diagnostic system developed by psychiatry through the decades, effective for the treatment and care with a feeling of competency, has to be changed to enable a selection of similar, comparable "research objects". Research demands rigorous and objective criteria for disorders still diagnosed when particular psychopathological symptoms – mental and behavioural phenomena – are identified.

The psychiatrist is confronted with the new problem: is the phenomenon being the subject of scientific studies the same, which is experienced by his patient?

Is scientifically oriented psychiatry loosing something?

Antoni Kępiński [13] warned psychiatry about the danger of following the need

of becoming a science in a naturalistic way. He emphasised that naturalistic science requires immobilisation of the object studied. The presumption is interpreted nowadays as ethical rather than a methodological one. Kępiński explicitly stressed that the psychiatrist adopting the naturalistic methodology takes the freedom from the person studied. But he was of opinion that the knowledge on the human being can found only when the researcher and his/her object are equal. The even position is, he wrote, the only way to come closer to the truth on the human being. The ethics cannot be separated in this statement from methodology.

Is psychiatry loosing something essential turning towards biology for scientific solution of its problems? The answer depends on understanding the essence of psychiatry. Taking the position declaring psychiatry as the discipline dealing with mental disorders, which are perceived as independent beings, touching persons – possibly not. Especially when prevention is left to other disciplines. But psychiatry understood as discipline having as subject – persons suffering from mental disorders rather – adopting naturalistic approach deprives itself from ability to see a human being as a person. Alanen [14] quoting Fleck on: "...regressive development of reductionistic ideas of patient care, leading a view of patients as containers of neurochemical aberrations..." probably was of the same opinion. However, this should not be understood as an appeal to stop the biochemical studies. It rather calls for carefulness in generalisations of findings of observations in a narrow field.

What are psychiatrists expecting from biology?

Is there anything else psychiatrists turn towards biology for, except methodology? Does progress in biology arouse any hopes for psychiatry? Psychiatry never lost the strong connection with biology and has been always carrying hopes that discoveries within biology will be useful in solving problems of mental disorders. Moreover, all meaningful theories in psychiatry, Freud's psychoanalysis including, are somehow related to biology. The reference was the state of knowledge of the brain anatomy and functioning. Contemporary psychiatry has never looked for the mind in diaphragm but incorporated biological knowledge on the brain as the part of the body responsible for mental life. But this concept, by the end of the 20th century was not covering the whole biological knowledge on human beings. The reference to the concept of life as a self-regulating system [6] required turning attention towards the impact of all systems influencing behaviour and experience. The most important are, besides the central nervous system – the endocrine and immune systems. They all stay in interaction [15].

Psychiatry, as it seems, hopes to find in biological research answers for the key questions of the causal factors of mental disorders, their causal treatment and effective prevention.

So, the most important question psychiatry turns with to biology is the question of causal, biological, mechanisms of mental and behavioural disorders.

There are well-motivated reasons to form such a question. Medicine owes biological research results finding a causal factor of many disorders. Thanks to them effective methods of treatment and prevention have been introduced. The psychiatric success

with *paralysis progressiva*, however, has not been followed in spite of extended studies. The illustrative example can be that of possibility of relation between viral infection in pregnant women and schizophrenia in offspring [16]. This relation is understood as infection impact on foetus brain development rather resulting in vulnerability, rather then a proof that schizophrenia is an immediate consequence of a viral infection. Nevertheless this interpretation is based on a presumption of a close relation between brain functions and mental life, and in consequence mental and behavioural disorders.

It seems to be clear that formulation of the next questions on relations between mental and behavioural disorders and the body functions requires new formulations on the disorders.

The best example is the American Psychiatric Association solution presented in DSM-IV. The most important approaches are postponement of traditional division of causal factors of mental disorders (endogenous, psychological and exogenous), and as much traditional division of mental disorders into "minor" and "major". The new criterion introduced is suspected dysfunction being a main feature in a group of mental and behavioural disturbances. Knowledge on functional anatomy and biochemistry of the brain allowed for a hypothesis on causal relation between dysfunction of particular, and possible to identify parts and/or systems in the brain and anxiety, disturbance of affect, memory or cognition. A large group of research studies carried on in psychiatry concerned dysfunction of this kind. New technology has opened possibility to assess a size of particular parts of the brain and to study function of the brain with very sophisticated methods of imaging. In addition to *post mortem* microscopic studies. A reasonable body of knowledge comes from studies on animal models of mental functions.

There is yet another group of questions psychiatrists turn with to biology. These aim to solve the old problem of genetic transmission of mental disorders. Majority of genogramme based studies indicate that the genetic material transmitted from generation to generation is of importance in genesis of mental disorders. Their results and conclusions are based on statistical analysis of differences in prevalence of mental disorders in compared groups of identical and non-identical twins, or siblings, or other relatives. There are however studies including both impact of genetic equipment and environment on prevalence of mental disorders. Finnish Tiennari [17] study on adopted children of schizophrenic mothers are of the special importance for psychiatry. Results of long-term study proved that mother's disorder was of stronger, than family environment, influence on development of schizophrenic disorder in child. Biological (including genetic) impact was proved to be stronger in comparison with environmental one. The whole problem in the Tiennari study had been conceptualised and formulated within the frame of biological methodology. Actually, this is the problem of interaction between nature and nurture in the development of an individual. Or, the problem of interaction between genotype and environment in development of phenotype. The problem, which is at the moment intensively studied. And, what is especially promising, the studies are a good example of joint efforts of molecular biologists, clinicians and developmental pathologists.

Animal (Rhesus) studies brought results on dependence of expression of the gene responsible for serotonine transportation, and the quality of care [18, 19]. Studies on

alcohol, hazard and substance dependent people brought information of higher frequency of A1 and A1A2 alleles, and lower number of D2 receptors. The findings in studies on human populations with eating disorders and borderline personality disorders were similar. Prospective studies on effects of infantile (18 people) trauma revealed a relation between the consequences and presence of allele A1 [20]. The results can be interpreted as indicating the role of early childhood trauma as activating the gene whose expression limits the person's adaptation ability forming vulnerability to stress later in life [21]. There are, as it seems, presumptions to formulate a hypotheses that inadequate parental care influences penetration of one of the alleles of the gene 5-HTT responsible for serotoninergic dysfunction; experience of physical and psychological abuse and allele A1 of the gene D2 determinate personality disorder; Post-traumatic Disorder in the mother in interaction with dopamine receptor in the baby results in dysfunctional attachment causing a mental disorder.

Formative role of early experiences can – maybe – be explained by their impact of the gene expression. Fonagy quoting Rutter [22] formulated a thesis on significant influence of intrapsychic function (determined by conscious and unconscious experience attributions) on appearance and course of mental disorders.

Fonagy introduces his own concept of Interpersonal Interpretative Mechanisms (IIM – faculty of psychological interpretation, attribution of own and others mental states, which is a background of behaviour prediction). According to Fonagy, IIM is responsible for "moderation of genetic impact via perception of social environment". The concept may explain why disorders do not appear in spite of evident genetic predisposition. That means it indicates biological ways of beneficial influence of family, which was demonstrated in other studies [e.g. 23]. IIM develops within the attachment relationship.

Recent research on infant – mother relationship results indicate a crucial role of "good enough attachment" between second and eighteenth months of infant life on right hemisphere limbic structures development, and negative impact on the same if the attachment relationship fails [24, 25]. These are mainly based on animal model studies. Nevertheless they allow for conceptualisation and construction of new models. Above all bring new information on the role of early interpersonal experience on the brain development.

Studies on patients with brain damage [e.g. 26] and brain imaging in children emotionally neglected [27] brought evidence on the role of the prefrontal lobe in emotional functioning of human being. Fonagy, using Eric Kedalls reasoning, presented an opinion, that the concept explains mechanisms of effective psychosocial preventive measures and psychotherapy. Psychosocial environment factors, according to Fonagy are potent in changing specific gene expression.

Clinical experience as well as experimental studies have been giving evidence on necessity of stimulation for development of functions determined in a genetic way. The good example, and well documented is visual function [28].

Research on genetic correlates of mental and behavioural disorders are especially interesting in the case of disorders difficult to precise nosological delineation. Behavioural disorders appearing specifically in childhood and adolescence and learning

difficulties in childhood are among such categories. Antisocial behaviour disorder in children and adolescents has been understood as determined genetically in the great measure, since Robins prospective studies. More sophisticated later studies [29] gave evidence, that genetic influence explain behavioural disorder in 63% to 68% depending on developmental stage. Moreover a set of correlating genes changes in the course of child's development; only a third part has been found explained by the same genes. These results remind about two important things. The first is modesty in interpretation of empirical data. The other - confirmation of environmental-genetic interaction in forming of mind and behaviour.

Two examples reminding the need of researcher modesty

One of the more important concepts within psychoanalytical theory of mental functioning (and mental disorders) is the defence mechanism called suppression. Mental experience which is too difficult to be solved, according to psychoanalytical theory, becomes actively suppressed to subconsciousness. Results of neuroscience research done in the last decade give evidence on subconscious mental life, but quite vary. Animal studies proved, that anxiety provoking information does not reach the brain parts responsible (according to other studies [30]) for conscious experience. In other words – frightening stimuli arouse regulating brain activity on a subconscious level. The same centres however, receive information from those superior brain structures whose activity is responsible for consciousness. The results are so exciting that one cannot refrain from speculative interpretation. It seems they allow for construction of the new vision on consciousness – subconsciousness relation. Different to that presented by Freud. And, of course, quite new conceptualisation of anxiety disorders. But above all they confront us with evidence of non-symmetry in functional connections between subcortical centres and cortex.

Discovery leads to new questions

Another example is helplessness we feel when trying to explain a complex process of art perception. Neuroscience studies on vision [28] gathered enormous amount of information on brain functioning in the visual process. Number of centres involved in processing when we look at something, as well, as space they occupy in the brain, is surprising. The number of narrowly specialised parts of the process is even more astonishing. Zeki [28] hypothesised even that modern art such as Mondrian's abstract pictures, Cezanne's cubist landscapes or Calder's mobile had been pre-conditioned by specific functional brain structures processing simple geometric figures, clear colour squares or moving red objects. Nevertheless he was aware the knowledge developed till now failed to explain aesthetic experience. Even after taking into account separate ways of brain processing of known and unknown visual objects.

There is no evidence to show that a mental disorder is less complex than an aesthetic experience. So, if physiology fails to explain our experience in front of Rembrant's "Jewish Bride" we should be modest in expectations that in this way we shall find

explanation of e.g. depression. So, formulating questions concerning biology of mind we can expect valuable answers, but still – at the moment at least – not conclusive.

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